

This month's edition of *What's Happenin'* will focus on two very different GIS applications that Iowa DNR staff has recently developed. The "Recreation Map" is a web-based application that provides the location and boundaries of Iowa's public lands, their facilities and attractions, as well as the businesses and services in their surrounding areas. The other application, RASCAL, was developed in-house by staff of the Iowa DNR's Watershed Improvement Section. This custom data collection application, which utilizes hand-held computers, GIS, and GPS, has streamlined the Section's efforts to measure the conditions of many Iowa streams.

The Recreation Map: Iowa DNR's Latest IMS Website

Recently a new Internet Map Service (IMS) site, the [*Recreation Map*](#), was added to the growing list of IMS sites provided by the Iowa DNR. Although most of the IMS sites offered by the DNR are related to the study and protection of Iowa's natural resources, the [*Recreation Map*](#) is focused on providing information for those engaged or interested in exploring Iowa's outdoor recreational opportunities.

The [*Recreation Map*](#) includes "basic" layers such as topographic maps, color aerial photography, public lands, roadmaps, town locations – much like the existing IMS sites. In addition to the basic layers categories, it divides newly developed datasets into alternate categories.

One category of particular interest to some is the "Camping" group which includes the [*Reservable Campground*](#) layer. This layer, when active, can be used to reserve campsites at various State parks. By using the *link* tool (figure 1) you can connect directly to the IDNR's Online Reservation System then reserve camp sites at the park of your choice.



Figure 1. Link tool found at top of menu bar.

There are two categories called "Boating" and "Fishing" that were developed using the DNR's 1993 publication [*Iowa Stream Fishing and Canoe Guide*](#) and other reference documents. These categories contain the [*Boat Access*](#) and [*Fishing Access*](#) layers. Included in these layers is information regarding on-the-ground conditions for these stream/river accesses, such as boat ramp type (i.e., gravel vs. paved ramps or carry-down conditions), amenities offered at the site (i.e., restrooms, camping, potable water), and how far the river distance is to the next access downstream. Also included in the "Boating" and "Fishing" categories are the [*Water Hazard*](#) and [*Trout Stream*](#) layers. The water hazards layer was based off an earlier DNR inventory of dams on Iowa waterways, with visible hazards added as the access information was being collected.

This dataset is by no means complete, but more points will be added to the access and hazards layer as information becomes available. In the meantime, users should be aware that the best strategy in locating water hazards is to remain alert while out on the water and not to rely on this dataset as your sole source for locating major water hazards.

Other new categories are the “**Wildlife Management Area**” (WMA) and “**Conservation & Recreation Land.**” These offer approximate boundary locations for recreation sites under State and county ownership and management. Wildlife Management has parking lot and boat ramp locations for WMAs. The Conservation and Recreation category offers boundaries of state parks/preserves, public prairies, essentially all conservation and recreation lands managed by local, State, and Federal entities.

The final “newer” category is the “**Service/Business**” Folder (figure 2). This dataset, which was provided through a Partnership with Workforce Development, will be updated on a quarterly basis. This dataset has locations for any kind of service a person might need while on vacation, whether it be a long weekend or an all summer RV tour. Businesses such as grocery stores, sporting goods stores, book stores, video rental and other supplies are included. Also listed are museums, craft stores, wineries or other artisan related sites.

Need repairs? Different repair related businesses are also included in this layer, such as automotive, RV and boat. Many more businesses that provide services convenient to those recreating in Iowa are included. Specific services have been symbolized uniquely in order to ease the search process for users.

Other areas of interest in the process of being added to the *Recreation Map* are bicycle trails, horse riding trails, and canoe routes. Others will be added as the need arises.

Go to <http://csbweb.igsb.uiowa.edu/imgate/introduction/home.asp> and check out what the DNR has to offer by visiting the *Recreation Map* site. All IMS sites have a link for first time users located under “*Getting Started*” towards the top of the page. Help in using the map services is available in the upper right corner of the page where it says “*for website help, click here*”.

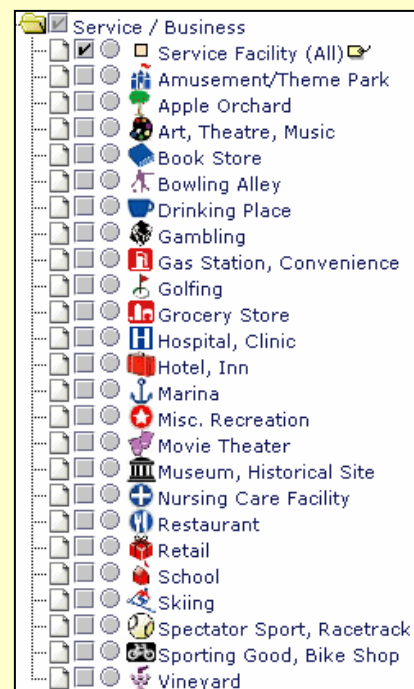


Figure 2. The Service and Business category with associated layers.

Utilizing GIS Technology in the Field

By Adam Kiel

For many DNR employees collecting data in the field has traditionally been a pen and paper activity but more and more data can now be collected using mobile computers, GIS and GPS tools. Custom data collection applications and data entry forms can easily be created to streamline data collection and in many cases, speed up the process of collecting, uploading and analyzing field data. The Watershed Improvement Section has recently begun to collect field data using Trimble's GeoXM GPS receivers (figure 3)



Figure 3. The Trimble GeoXM GPS receiver displays GIS information by using ArcPad Software.

equipped with customized versions of ESRI's ArcPad software. The following case study discusses how mobile computing was developed and used to conduct field survey activities.

RASCAL In-Stream Assessments

Assessing soil erosion from upland areas of watersheds has become a valuable tool in addressing water quality issues in Iowa's lakes, rivers and streams. Looking at only the upland areas however, does not give water quality professionals the whole picture; this is where RASCAL plays a complementary role. The RASCAL procedure; Rapid Assessment of Stream Conditions Along Length, was modified from the NRCS Stream Visual Assessment Procedure to better fit what DNR water quality professionals are looking for when assessing in-stream and near-stream environments. The RASCAL data collection procedure has been developed to function as an easy to use application for use with ESRI's ArcPad and Trimble's GeoXM GPS receiver (figure 3).

Evaluating stream conditions initially was conducted using paper maps and datasheets in combination with a simple Garmin GPS to mark survey locations. The need for advanced survey techniques was soon realized and the decision was made to convert to a fully computerized data collection method eliminating the need for paper maps and datasets that can easily be damaged in harsh or wet conditions. After reviewing various products currently on the market it was decided to build the data collection module using ESRI's ArcPad Application Builder software. ArcPad Application Builder's connection to ArcGIS 9.x was seen as beneficial as was the ability to create custom toolbars and tools using simple wizards and VBScript coding language. (ArcPad Application Builder is in-office software used for application development, ArcPad is field software run on mobile computers or PDAs). Customizing the user interface with only the necessary tools has allowed for the development of a simple easy-to-use ArcPad application. Custom VBScripts were written and attached to toolbar

buttons that simplify many tasks in ArcPad. For example, by pressing the add stream point of interest button the script will load the necessary data layer(s), activate the GPS, ensure the GPS is receiving an adequate signal, add a feature to the data set (point, line or polygon), and launch a data entry form, all at the click of one button.

The RASCAL procedure asks surveyors to evaluate in stream and nearby stream conditions and answer a few simple questions about what they are seeing. For example, surveyors are asked to note stream substrate, pool frequency, canopy cover, bank type, bank height, neighboring land cover and livestock access (figure 4). Point features such as tile outlets, storm sewer outlets, stream crossings, severe bank erosion, and trash piles are also GPS'ed and attributed.

Figure 4. Stream evaluation form filled out by surveyors.



Figure 5. A surveyor can validate his or her location with the help of a GPS point displayed over an aerial photography.

One of the major benefits of using ArcPad is that other GIS data layers can be viewed on-screen while working in the field (figure 5). For example, when collecting data for the RASCAL in-stream assessment it may be useful to display a clipped version the 2002 CIR or a data layer showing all streams and rivers. Also beneficial is ArcPad's auto-center functionality. When the GPS is activated, ArcPad will automatically pan the map view to keep the current location centered on the screen.

When field collection is completed transferring data from the mobile device (GPS) to either a desktop or laptop computer is also a very simple procedure. Simply place the GPS unit on its docking station and connect via a USB cable to either a desktop or laptop computer. Then using Microsoft's ActiveSync program the mobile device will appear as a new drive in Window's Explorer, similar to how a USB Flash Drive is displayed. Files can then be transferred to and from the mobile devices simply by copying and pasting.

Viewing field collected data is as simple as loading the data layer into ArcView. When ArcPad collects data points, lines, or polygons it adds features to existing shapefiles and adds attributes entered via data entry forms to the shapefiles *.dbf file. Since the attribute table is saved as a *.dbf file it can easily be uploaded to a database or opened in Excel for further report preparation or analysis.

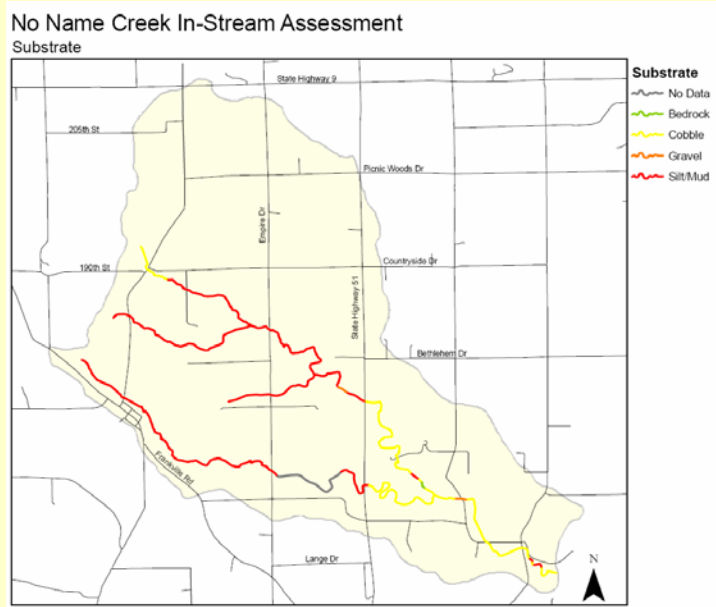


Figure 6. Substrate map of “No Name Creek”. This is an example of one of the possible maps that can be generated from RASCAL data.

Data collected during the RASCAL in-stream assessment is analyzed in ArcView and maps are prepared to assist watershed coordinators in identifying priority areas (figure 6). Maps show color coded stream segments depending on priority attributes. For example, areas with unstable banks are highlighted in red and stable banks are shown in green.

In summary, the use of mobile computers equipped with GPS and a custom ArcPad application have simplified the data collection procedure for in-stream assessments.

Analyzing and displaying survey data is made simple thanks to ArcPad’s ability to add field data to existing shapefiles and associated attribute tables. Please contact Adam Kiel at adam.kiel@dnr.state.ia.us with any questions.

Contact Us

If you would like to contribute to this newsletter, or if you have questions, concerns, or suggestions regarding this newsletter contact:

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Updates and New Data

A listing of updates and new data added to the [NRGIS Library](#) in the last year can be accessed by selecting “Updates” in the upper left corner of the library website link, or go to http://www.igsb.uiowa.edu/nrgislibx/updates_frame.asp.